REMARKS

Responsive to the Office Action mailed April 5, 2011, Applicants respectfully request entry of these amendments and remarks notwithstanding the finality of the Office Action, and respectfully request reconsideration and allowance of the application.

Status of the claims

Claims 1-24 and 26 were pending as of the August 17th mailing date of the Office Action. Claims 3, 4, 7, 8, 22, and 23 are withdrawn by the Office.

Claims 1, 2, 5, 6, 9, 10, 13-15, 17-21 and 24 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Ooi et al., Bioinformatics vol. 19 no. 1 pp. 37-44 (2003) (hereinafter "Ooi") in view of Chtioui et al., J. Sci. Food Agric. (1998) (hereinafter "Chtioui").

Claims 11, 12, and 26 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Ooi in view of Chtioui in further view of Liu et al., Evolutionary Computation, 12-17 May, pp. 297-302 (2002) (hereinafter "Liu").

Claim amendments

Claim 1 is amended to incorporate the subject matter of dependent claim 2, and to recite "the computational genetic evolving including mating pairs of parent chromosomes of the present generation chromosome population to generate offspring chromosomes" recited in dependent claim 5. **Claim 2** is canceled, and **claim 5** is amended to cancel subject matter now moved into claim 1. **Claim 9** is amended to cancel subject matter subsumed in more specific form into amended claim 1.

The finality of the Office Action should be withdrawn

Claim 15 recites selectively mutating genes values of the offspring chromosomes that are unique to one or the other of the parent chromosomes without mutating gene values of the offspring chromosomes that are common to both parent chromosomes. The previous Office Action mailed March 31, 2010 did not identify

this limitation in either Ooi or Chtioui. The present Office Action *still* does not identify this limitation in either Ooi or Chtioui. The "articulation" of the rejection of claim 15 is an omnibus argument pertaining to claims 1, 15, 19, and 21, and does *not* address the foregoing limitation of claim 15. Office Action pages 6-7. Nothing in the Response to Arguments at pages 3-5 addresses the foregoing limitation.

Respectfully, the Office should either identify where this recited limitation is found in Ooi and/or Chtioui, or withdraw the rejection and allow claim 15, or apply a new rejection including a reference addressing the foregoing limitation. In the latter case, a new *non-final* Office Action would be required in order to permit Applicants fair opportunity to reply to this *new* rejection which would *not* be necessitated by the amendment of claim 15 which merely added a "using a computer system" recitation.

Claim 19 recites introducing a selected level of simulated noise into values of the set of measurements for a group of subjects. Claim 19 stands rejected as unpatentable over the proposed combination of Ooi and Chtioui. However, the Office Action expressly states:

> In response to applicant's argument regarding limitations directed to noise, Ooi and Chtioui *do not teach* introducing a selected level of noise into values of measurements of the measured subjects, as in claims 11, 19, and 26. However, Liu describes the addition of noise into measurement data at a number of different points; see page 297, Col. 2, as set forth below.

Office Action page 5 (italics added).

Whether Liu teaches addition of noise is irrelevant as pertaining to claim 19, because ***claim 19 is rejected based on Ooi and Chtioui alone***. If the Examiner believes that Lui is additionally required in order to properly reject claim 19, then the Examiner should issue a new Office Action making that new rejection, and should make that Office Action *non-final* in order to permit Applicants fair opportunity to reply. Applicants note that such a *new* rejection would *not* be necessitated by Applicants' amendment of claim 19, because that amendment merely added the recitation of a computing system to address § 101, and did *not* affect the *original* recitation pertaining to introducing noise.

Claim 21 recites selecting chromosomes that survive into each successive generation using a selection criterion biased toward selecting chromosomes having a smaller number of expressed genes over chromosomes having a larger number of expressed genes. This subject matter was added from claim 25, and thus claim 21 has scope commensurate with claim 25 which was examined in the previous Office Action mailed March 31, 2010. That previous Office Action did not identify the foregoing subject matter in Ooi, Chtioui, or their combination.

The present Office Action *still* does not identify the foregoing subject matter in Ooi, Chtioui, or their combination. Claim 21 is also a subject of the omnibus argument directed to claims 1, 15, 19, and 21, which does *not* address the foregoing limitation of claim 21. Office Action pages 6-7. (Said another way, the Office Action nowhere alleges that either Ooi or Chtioui disclose or fairly suggest selecting chromosomes that survive into each successive generation *using a selection criterion biased toward selecting chromosomes having a smaller number of expressed genes over chromosomes having a larger number of expressed genes.*) Moreover, nothing in the Response to Arguments at pages 3-5 addresses the foregoing limitation.

Respectfully, the Office should either identify where this recited limitation is found in Ooi and/or Chtioui, or withdraw the rejection and allow claim 21, or apply a new rejection including a reference addressing the foregoing limitation. In the latter case, a new *non-final* Office Action would be required in order to permit Applicants fair opportunity to reply to this *new* rejection which would *not* be necessitated by the amendment of claim 21 which merely moved the subject matter of already-examined dependent claim 25 into base claim 21.

The claims present patentable subject matter, meet all statutory requirements, and should be allowed

Claim 1 is recites each chromosome having (i) an ordered set of genes specifying a sub-set of an associated set of measurements wherein each gene of the ordered set of genes contains an index value which indexes a measurement of the associated set of measurements and (ii) an expressed sub-set-size gene containing an

ordinal position value separating the expressed and unexpressed genes in the ordered set of genes; and computationally genetically evolving the genes of the chromosomes including the expressed sub-set-size gene respective to a fitness criterion evaluated without reference to unexpressed genes to produce successive generation chromosome populations.

Ooi discloses chromosomes in which each gene contains an index value which indexes a measurement of the associated set of measurements. Ooi p. 39 1st column (heading "String Representation"). Each chromosome is represented by a string including an integer R specifying the size of the predictive set (corresponding to the expressed genes) and a set of genes $g_1,...,g_{Rmax}$ of which the genes $g_1,...,g_R$ are the expressed genes. Ooi page 39 1st column (heading "STRING REPRESENTATION"). The gene pool is initialized to include N chromosomes, each represented by a string having a randomly selected predictive set size R in the range $[R_{min}, R_{max}]$ and a set of gene indices $g_1,...,g_{Rmax}$. Ooi page 39 1st col. onto 2nd col. heading "Initialization and Evaluation". This gene pool is then evolved through the exchange of genetic information between pairs of parent chromosomes.

However, there is no suggestion in Ooi that the predictive set size R is considered to be an additional *gene* that is *evolved* to optimize the number of features used in the classification. Rather, only the genetic information (corresponding to gene indices $g_1,...,g_{Rmax}$) is disclosed as being evolved. Ooi never refers to the predictive set size R as a gene, and Ooi does not provide any way by which the predictive size set R might evolve.

Chtioui discloses a very different approach, in which chromosomes comprise *binary* genes, in which a value of 1 for the binary gene selects the corresponding feature (and, presumably, 0 indicates the corresponding feature is not selected). Chtioui p. 79 right column bottom section. The size of each chromosome is thus equal to the number of available features. *Id.* There is no analog in Chtioui to the expressed sub-set-size *gene* of claim 1, or even to the predictive set size R of the genes of Ooi.

Patentability of base claims 15, 19, and 21 was addressed in previous Amendment A and in the section herein headed "The finality of the Office Action should be withdrawn". In the interest of brevity no further argument is presented here.

Claim 16 depends from claim 15, and recites wherein a mutation rate for the selective mutating of the gene values that are unique to one or the other of the parent chromosomes is greater than 5%. The Office Action argues this would have been obvious since Ooi "predictably calculates mutation rates of genes up to 0.02%; see page 39, Col. 2, page 41, Col. 1, and Table 1." Office Action pages 10-11.

Respectfully, Ooi does not "calculate" mutation rates of genes up to 0.02%. Rather, Ooi *performs experiments* with mutation rates (probabilities p_m) in the range 0.0005-0.02. The *lower* 5% threshold of claim 16 is *250 times larger* than the *uppermost* 0.02% rate of Ooi. Respectfully, the skilled artisan reading Ooi would find no motivation to test a mutation rate *250 times larger* than the *largest* mutation rate tested by Ooi. The Examiner's rationale appears to be that since the reference (Ooi) tested different mutation rates within one range, it would be obvious to test *any other* range, no matter how wildly different from the range tested by the reference.
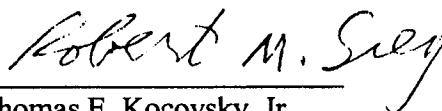
Applicants again remind the Office of the potential for rejoinder of withdrawn claims 3, 4, 7, 8, 21, and 22 directed to unelected species, as per 37 C.F.R. § 1.141, upon allowance of any base claim, and urge reinstatement and consideration of any of claims 3, 4, 7, 8, 21, and 22 upon allowance of a base claim from which it depends.

In view of the foregoing, Applicants urge reconsideration and allowance of claims 1, 3-24 and 26 as set forth herein.

CONCLUSION

In view of the foregoing, Applicants urge allowance of all claims 1, 3-24 and 26. In the event personal contact is deemed advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned at 216.363.9000.

Respectfully submitted,

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